APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,719	12/24/2003	Akihiko Ito	117938	8334

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ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 08/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>28 April 2006</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-17</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-17</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>24 December 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4/28/06;11/28/05;</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   Claims 1-12, 14 and 17are rejected under 35 U.S.C. 102(b) as being anticipated by

Yamazaki et al. (US Patent No. 6,215,466).

As to claim 1, Yamazaki discloses a driving method for an electro-optical device (e.g.

liquid crystal display) that performs gradation display of pixels by using a plurality of sub-fields

defined by dividing a predetermined period (e.g. as shown in Fig. 3A, four subfields are defined

by dividing a predetermined period such as 1, 2, 4 and 8), the driving method comprising: setting

level values (e.g. 0, 1,..., 60, gradation levels), as data for the corresponding sub-fields that is

supplied to the pixels, by selecting the level values from among three or more different level

values in accordance with gradation data in such a manner that the absolute value of the amount

of change in data between adjacent sub-fields is a predetermined amount of change or less (see

gradation levels "43"as shown in Fig. 3(A)); and performing the gradation display of the pixels

by supplying the data set for the corresponding sub-fields to the pixels (see Fig. 4).

As to claim 2, Yamazaki discloses a driving method for an electro-optical device (e.g.

liquid crystal display) that performs gradation display of pixels by using a plurality of sub-fields

defined by dividing a predetermined period (e.g. as shown in Fig. 3A, four subfields are defined

by dividing a predetermined period such as 1, 2, 4 and 8), the driving method comprising: setting

level values (e.g. 0, 1,…, 60, gradation levels), as data for the corresponding sub-fields that is

supplied to the pixels, by selecting the level values from among three or more different level

values in accordance with gradation data in such a manner that the level values are adjacent to

each other (see gradation levels "43" as shown in Fig. 3(A)); and performing the gradation

display of the pixels by supplying the data set for the corresponding sub-fields to the pixels (see

Fig. 4).

As to claim 3, Yamazaki discloses a driving method for an electro-optical device (e.g.

liquid crystal display) that performs gradation display. of pixels by using a plurality of sub-fields

defined by dividing a predetermined period (e.g. as shown in Fig. 3A, four subfields are defined

by dividing a predetermined period such as 1, 2, 4 and 8), the driving method comprising:

selecting level values (e.g. 0, 1,…, 60, gradation levels), as data for the corresponding sub-fields

that is supplied to the pixels, from among three or more different level values in accordance with

gradation data and of changing the level values within the adjacent level values in accordance

with an increase of gradation values defined by the gradation data (see gradation levels "43" as

shown in Fig. 3(A)); and performing the gradation display of the pixels by supplying the data set

for the corresponding sub-fields to the pixels (see Fig. 4).

As to claim 4, Yamazaki discloses that the data being a data voltage, and the level values

being set by voltage values (see Fig. 4).

As to claims 5, 14, it is inherent that the voltage values can be represented by a current

value since the voltage value is proportional to the current value in accordance with the

resistance of the electrode.

As to claim 6, Yamazaki discloses a driving method for an electro-optical device (e.g. liquid crystal display) that performs gradation display of pixels by using a plurality of sub-fields defined by dividing a predetermined period (e.g. as shown in Fig. 3A, four subfields are defined by dividing a predetermined period such as 1, 2, 4 and 8), the driving method comprising: setting level values (e.g. 0, 1,..., 60, gradation levels), as data for the corresponding sub-fields that is supplied to the pixels, by selecting the level values from among a plurality of different level values in accordance with gradation data (see Fig. 3A); writing the data to the pixels by supplying the data set for the corresponding sub-fields to the pixels by current levels (see Fig. 4); and performing the gradation display of the pixels by setting driving currents corresponding to the data written to the pixels and by supplying the set driving currents to electro-optical elements that emit light at brightnesses corresponding to the driving currents (see Fig. 4).

As to claim 7, Yamazaki discloses an electro-optical device that performs gradation display of pixels by using a plurality of sub-fields defined by dividing a predetermined period, the electro-optical device (e.g. liquid crystal display) comprising: a plurality of scanning lines (see Fig. 4); a plurality of data lines (Fig. 4); a plurality of pixels (Zn,m, Fig. 4) provided in accordance with crossing of the scanning lines and the data lines; a scanning line driving circuit that selects one of the scanning lines corresponding to one of the pixels to which data is written by outputting a scanning signal to the one of the scanning lines (see Fig. 4); a data conversion circuit (e.g. A/D converter in Fig. 4) that sets level values, as the data for the corresponding sub-fields, the data being generated by converting gradation data, by selecting the level values from among three or more different level values (see Fig. 3A) in such a manner that the amount of change in data between adjacent sub-fields is a predetermined amount of change or less; and a

data line driving circuit that cooperates with the scanning line driving circuit and that outputs the

data for the corresponding sub-fields, the data being generated by the data conversion circuit, to

one of the data lines corresponding to the one of the pixels to which the data is written (see Fig.

4).

As to claim 8, Yamazaki discloses the predetermined amount of change being one step

level corresponding to the amount of change between the level values that are adjacent to each

other (see Fig. 3A).

As to claim 9, Yamazaki discloses an electro-optical device (e.g. liquid crystal display)

that performs gradation display of pixels by using a plurality of sub-fields defined by dividing a

predetermined period (e.g. as shown in Fig. 3A, four subfields are defined by dividing a

predetermined period such as 1, 2, 4 and 8), the electro-optical device comprising: a plurality of

scanning lines (Fig. 4); a plurality of data line (see Fig. 4)s; a plurality of pixels (Zn,m, Fig. 4)

provided in accordance to crossing of the scanning lines and the data lines; a scanning line

driving circuit that selects one of the scanning lines corresponding to one of the pixels to which

data is written by outputting a scanning signal to the one of the scanning lines; a data conversion

circuit (e.g. A/D converter in Fig. 4) that sets level values, as the data for the corresponding sub-

fields, the data being generated by converting gradation data, by selecting the level values from

among three or more different level values (see Fig. 3A) in such a manner that the level values

are adjacent to each other; and a data line driving circuit that cooperates with the scanning line

driving circuit and outputs the data for the corresponding sub-fields, the data being generated by

the data conversion circuit, to one of the data lines corresponding to the one of the pixels to

which the data is written (see Fig. 4).

As to claim 10, Yamazaki discloses an electro-optical device (e.g. liquid crystal display) that performs gradation display of pixels by using a plurality of sub-fields defined by dividing a predetermined period (e.g. as shown in Fig. 3A, four subfields are defined by dividing a predetermined period such as 1, 2, 4 and 8), the electro-optical device comprising: a plurality of scanning lines (Fig. 4); a plurality of data lines (Fig. 4); a plurality of pixels (Zn,m, Fig. 4) provided in accordance to crossing of the scanning lines and the data lines; a scanning line driving circuit that selects one of the scanning lines corresponding to one of the pixels to which data is written by outputting a scanning signal to the one of the scanning lines; a data conversion circuit (e.g. A/D converter in Fig. 4) that selects the data for the corresponding sub-fields, the data being generated by converting gradation data, from among three or more different level values (see Fig. 3A) and that changes the level values within the adjacent level values in accordance with an increase of gradation values defined by the gradation data; and a data line driving circuit that cooperates with the scanning line driving circuit and that outputs the data for the corresponding sub-fields, the data being generated by the data conversion circuit, to one of the data lines corresponding to the one of the pixels to which the data is written (see Fig. 4).

As to claim 11, Yamazaki discloses the data line driving circuit outputting the data for the corresponding sub-fields to the one of the data lines by voltage levels (see Fig. 3A).

As to claim 12, Yamazaki discloses the one of the pixels including: a switching element (e.g. transistor as shown in Fig. 4) whose conduction is controlled by the scanning signal for the one of the scanning lines; and an electro-optical element including a pair of electrodes and liquid crystal held between the pair of electrodes, the transmittance or the reflectance of the electro-

optical element being changed in accordance with the data supplied by voltage levels from the

one of the data lines via the switching element (see Fig. 4).

As to claim 17, Yamazaki discloses an electronic apparatus (e.g. LCD) provided with the

electro-optical device.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   Claims 13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Yamazaki et al. (US Patent No. 6,215,466) in view of Adachi et al. (US Patent No. 6,924,824).

As to claim 13, 15 and 16, Yamazaki discloses an electro-optical device (e.g. liquid

crystal display) that performs gradation display of pixels by using a plurality of sub-fields

defined by dividing a predetermined period (e.g. as shown in Fig. 3A, four subfields are defined

by dividing a predetermined period such as 1, 2, 4 and 8), the electro-optical device including: a

plurality of scanning lines (see Fig. 4); a plurality of data lines (see Fig. 4); a plurality of pixels

(Zn,m, Fig. 4) provided in accordance to crossing of the scanning lines and the data lines, a

driving element (e.g. transistor of Fig. 4) that sets corresponding driving currents in accordance

with the data; and an electro-optical element that emits light at brightnesses corresponding to the

set driving currents; a scanning line driving circuit that selects one of the scanning lines

corresponding to one of the pixels to which the data is written by outputting a scanning signal to

the one of the scanning lines; a data conversion circuit (e.g. A/D converter in Fig. 4) that sets

level values, as data for the corresponding sub-fields that is supplied to the pixels, by selecting

the level values from among a plurality of level values of different voltage values (see Fig. 3A)

in accordance with gradation data; and a data line driving circuit that cooperates with the

scanning line driving circuit and that outputs, by current levels, the data of voltage levels for the

corresponding sub-fields, the data being generated by the data conversion circuit and being

converted into data of current levels, to one of the data lines corresponding to the one of the

pixels to which the data is written (see Fig. 3A, 4).

It is noted that Yamazaki does not specifically discloses each of the pixels including a

holding device to hold data. Adachi is cited to teach a liquid crystal display device similar to

Yamazaki. As shown in Fig. 6, Adachi discloses each of the pixels including a holding device

(104) to hold data. It would have been obvious to one of ordinary skill in the art to have

modified Yamazaki with the features of the capacitor for holding the voltage data for the pixel as

taught by Adachi so that the pixel data can be maintained and displayed on the screen.

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure. The US Patents 5,459,495, 5,724,058, 5,861,869, 6,570,550, 6,894,671 and 7,057,597

are cited to teach a liquid crystal display device.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to XIAO M. WU whose telephone number is 571-272-7761. The

examiner can normally be reached on 6:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, RICHARD HJERPE, can be reached on 571-272-7691. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

x.w.

August 2, 2006

XIAO M. WU
Primary Examiner
Art Unit 2629